

The college campus as a living laboratory for meaningful food system transformation

Jason R. Evans^{a*}
Johnson & Wales University

April M. Roggio^b
University at Albany, State University of New York



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Abstract

As has become abundantly clear to the social scientists, agriculturalists, policymakers, and food justice advocates who have taken up the fight, progress toward more resilient, fair, and effective food systems is hard fought and prone to challenges. Vexingly, the competing goals of food system improvement even make defining “success” in food system transformation difficult: accessible, affordable food versus nutritious food; diversity in the agricultural economy versus the cost savings of consolidation; and consumer choice and variety versus the ecolog-

ical advantages of eating seasonally and locally.

In this commentary, we treat American college campuses as analogs of the larger food system and as such, laboratories¹ for study of these systemic tradeoffs and proving grounds for policy interventions. We argue that the lived context of college students approximates that of communities in which financial, logistical, and other challenges negatively affect nutrition, equitable food access, and food knowledge outcomes. We suggest that the rigorous assessment of changes in educational philosophy, management practices, and spending priorities on campuses may offer insight into the ways in which we might effect change throughout the broad national food landscape, to facilitate the transition to more equitable and just food systems.

^{a*} *Corresponding author:* Jason R. Evans, Ph.D., Dean, College of Food Innovation & Technology, Johnson & Wales University; 333 Shipyard Street; Providence, RI 02905 USA; +1-401-598-1443; jevans@jwu.edu

^b April M. Roggio, Ph.D., Research Associate, Center for Policy Research, Rockefeller College of Public Affairs, University at Albany, State University of New York; aroggio@albany.edu

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¹ Our propositions here connect more broadly with the literature examining the campus as a living laboratory, which addresses a wide array of sustainability issues (e.g., Gomez & Derr, 2021; Hansen, 2017; Save et al., 2021).

The U.S. Food System: A Snapshot

Although recognized globally for its productivity and technical efficiency, the U.S. food system fails on a number of fronts. The stressors of modern living paired with persistently low wages force many households to grapple with the tradeoffs between affordable, calorie-dense, heavily processed convenience foods and more expensive fresh foods that require both preparation and cook time (Patel, 2012). The demand for cheap food calls for a production system that relies on similarly low-cost agricultural inputs that generate severe ecological and human health outputs, including substantial food waste (Carolan, 2018)—what Benton and Bailey (2019) call the “paradox of productivity.” The population of farmers is aging, and many who are experimenting with nonconventional food production strategies, from agroecology to community supported agriculture (CSA), are not profitable enough to secure a living wage (Paul, 2019). And rapid, rampant consolidation has rendered the group of American food producers and manufacturers who actually put food on consumers’ tables shockingly small and fragile (MacDonald et al., 2018).

Manifestly, we are nutritionally deficient (Liu et al., 2020, 2021). Our rural communities lack adequate health care (Coughlin et al., 2019) and equal access to job opportunities (Devaraj et al., 2020). Industrialized soil nutrients poison watersheds (Glibert, 2020; Lintern et al., 2020), food-related disease plagues the poor and marginalized (Belanger et al., 2020; Kris-Etherton et al., 2020), and the impact of eating behaviors on every part of our physical, cognitive, and emotional being is often peripheral to consumer budgetary and convenience considerations (Dhakal & Khadka, 2021).

While the COVID-19 pandemic temporarily disrupted supply chains, the time, energy, and money required to access food has historically been relatively low for the average American consumer compared to the rest of the world. Grocery stores across the country abound with an unimaginable variety of safe and convenient food and beverage options. However, the costs imposed on society by food system failures—like exorbitant health care costs, distressed rural communities, and damaged ecosystems—seem too far removed, too global, to

warrant individual behavioral change or clamor for political action (Béné et al., 2019; Fanzo et al., 2020). Domestic food policy has attempted reform with debatable success. Farm bill–funded conservation programs, the Supplemental Nutrition Assistance Program (SNAP), and grant programs for diversifying farm operations and agricultural markets have had a measurable impact on system outcomes (Cox, 2006; Ratcliffe & McKernan, 2010). Nearly 90% of U.S. households are classified as food secure (U.S. Department of Agriculture Economic Research Service [USDA ERS], 2022), millions of highly erodible acres have been removed from production (USDA Farm Service Agency [USDA FSA], 2022) and there are opportunities for even the smallest farm operations to earn a living (Rupasingha & Pender, 2018).

Yet, this progress masks a myriad of underlying and worsening food system crises that have disproportionately impacted people of color (Islami et al., 2021; Paradies, 2006; Simons et al., 2018) and of lower socioeconomic strata (Liu et al., 2023; Vineis et al., 2020). Real transformation would show itself as more equitable health outcomes across racial and economic strata, visible changes in how agricultural land is used to feed people, and access to healthy food across all income levels. School systems, from elementary to postgraduate, would be imbued with the capacity and knowledge to nurture lifelong healthy eating habits. The scale and diversity of food processing and distribution infrastructure across the country would preclude outright supply chain failures. And a greater connection between nutrition outcomes and agricultural support programs in the U.S. would be apparent in policy related to sustainable economic development (Lang & Barling, 2013). This, alas, is not our reality. And, these issues have parallels on American college campuses that are significantly affecting student success.

Food and Today’s College Students

As college education has become more egalitarian, the socioeconomic diversity of students on America’s campuses has broadened (U.S. Government Accounting Office, 2018). Concurrently, as the academy has shifted its goals to align with neoliberal values of revenue generation, productivity, and

efficiency, the student has increasingly become a customer, purchasing a degree (Astin & Oseguera, 2004; Saunders, 2010). Iterative cycles of expanded availability of federal and other grant and loan programs, including expansion to older students and those with increased risk profiles, were followed by the expansion of academic programs and delivery modalities designed to meet the needs of the increasingly diverse higher education marketplace (Looney & Yannelis, 2022). One clear outcome of efforts to advance access and redraft the purpose of higher education has been a surge of older students, employed students, and students with children; according to the National Center for Educational Statistics, “nontraditional students” now make up a majority of students enrolled in college classrooms, and they require different services as they are frequently balancing jobs, families, and school (MacDonald, 2018; NCES, 2016).

Institutions of higher education have shifted toward supporting greater access and have redefined their goals to better respond to priorities involving the information and knowledge economy (Olssen & Peters, 2005; Peters & Humes, 2003; Temple, 2012; Wright & Shore, 2017). Accordingly, the cost of attending college has risen exponentially, leaving massive education debt and large numbers of cash-strapped students in its wake (Hemelt & Marcotte, 2011). Although there is some debate over how to rank the factors that have led to higher college costs,² we argue, based on the changes illustrated above, that students now enrolling are functionally different—and require different services, including a greater emphasis on housing and food security challenges—than those of previous generations. Many argue that today’s student is less prepared for the academic and personal rigors of college, demands more individual attention, is less self-reliant and, as noted above, may come from households experiencing financial stress, work a full-time job while going to school, or be raising children. The pandemic has only exacerbated those challenges (Becker, 2021; Denizet-

Lewis, 2017; Malesic, 2022; McMurtrie, 2022; Peltz et al., 2021). The college campuses of much of the 20th century had few staff and resources devoted to student mental health and counseling, retention, accommodation, and freshman transition; certainly, there were no on-campus food pantries or emergency funds for students going hungry. On the other hand, Goldrick-Rab (2018) argues that many of the services that previously supported students through obtaining a four-year degree are no longer providing adequate assistance, including safety-net programs such as SNAP and federal work-study programs designed to reduce the cost of attending college.

In short, our well-intentioned attempt to make college accessible to all has also contributed to conditions that make successfully completing a degree more challenging for many. From a systems perspective, this scenario was painfully predictable; we have enabled more people to go to college—indeed, made college a cultural requirement for adulthood—without also providing the conditions for success.

In recent years, research has unveiled a new and somewhat unexpected dimension of food system failure: food insecurity on American college and university campuses (Nazmi et al., 2019). Underlying society-wide problems related to household income, food costs, and access to food have collided with the aforementioned college affordability concerns and a cultural misperception of college as the indispensable ticket to the American dream. In effect, food insecurity among college students is at the center of a bleak Venn diagram of the food system, education system, and cultural predicaments.

Specifically with regard to student food insecurity, several culprits are easy to identify. College students are often transportation-limited or otherwise have inadequate access to a wide variety of food offerings. Decisions about what might be available to them on campus are made by budget-driven foodservice managers who, like food manu-

² Suggested factors include the debated “Baumol Effect” on faculty salaries, state funding cuts, bloated academic administration, and excess infrastructure capacity caused by the Baby Boom surge in campus construction. The Baumol effect refers to the rise of wages in jobs that have experienced little or no increase in labor productivity, in response to rising salaries in other jobs that have experienced higher productivity growth (Nose, 2015; Thille & Smith, 2010).

facturers and retailers, are adept at catering to calorie-hungry, “bang for the buck” consumers. The same consolidation and market power that define food processing, distribution, and retailing also describe the foodservice management sector, limiting campus foodservice directors’ choice of dining contractors to a scant few (Kelloway, 2018).

Certainly, fresh, raw ingredients for cooking are not ubiquitous on college campuses, as most on-campus living does not include cooking appliances or sufficient refrigerated storage. Even if residence halls across the country were outfitted with such amenities, incoming college students may lack food literacy and the time, skills, and resources for utilizing them. And, ultimately, real or perceived differences in prices between fresh, healthy diets and those laden with high-calorie, heavily processed foods may preclude already time- and money-pinched people from preparing food regularly. Moreover, research has concluded that some students are more at risk of food insecurity than others, particularly Black and Hispanic students (Bruening et al., 2016; El Zein et al., 2019), those employed but low-income (Freudenberg et al., 2013; Patton-López et al., 2014), and those receiving financial aid (Adamovic et al., 2020; Payne-Sturges et al., 2018). Many of the same students are also housing insecure (Adamovic et al., 2020).

While scholarship has leaned methodologically on case study research to identify significantly higher rates of food insecurity on college campuses than in the general population, Gunderson (2021) has injected some uncertainty into the conversation, arguing that different methods find very different results. In fact, Gunderson (2021) finds that for the 18–30 age group, nonstudents are significantly more likely to experience food insecurity, and that college students enjoy rates, on average, below that of the general population. This uncertainty calls for more rigorous assessment of the socioeconomic realities of college students. If college life now mirrors the rest of society more than ever (vast socioeconomic disparity, rising costs of living, mounting daily stressors of balancing financial concerns with work, family, and study), we stand to learn a lot about the larger food system by treating campuses as microcommunities—and analogs—thereof. Policy and other interventions aimed at

solving problems like food insecurity (and other forms of resource scarcity) in academic communities might be applicable outside campus walls and to broader food system challenges.

We suggest that campus-level changes in educational philosophy, management practices, and spending priorities may yield important outcomes, such as improved lifelong nutrition and wellness, especially crucial for those now affected by food security inequalities. Radical food systems transformation, so far, has been out of reach for the U.S.; we submit that addressing food systems issues on the level of the college campus might be a step toward realizing that transformation. Below, we outline three campus-level intervention areas that deserve longitudinal empirical analysis to determine their effectiveness when dispersed across different campuses, regions, and populations.

A Fundamental Reconsideration of Campus Spending Priorities

College administrators have raised student retention to a top strategic priority for the last 10 years (Hanover Research, 2014). With waning pools of prospective 18-year-olds in many parts of the country, enrollment managers argue that it is cheaper and easier to keep a current student than to find a new one (Fain, 2014; Ferguson, 2021). Implementation of “free” community college models will likely only reinforce this calculus as available prospective students flock to their lowest-cost options; 67% of respondents in a recent survey, for example, suggest that lowest-cost options are a very high priority for students, and particularly for families who are struggling (U.S. Department of Education, 2018).

Retention efforts on most campuses take the form of new campus services or enhanced, high-engagement faculty advising models (Basko, 2021). The logic is that if we surround students with a support network standing ready to address campus life, with its residential, financial, and academic conundrums, students will persist. If we throw in the occasional social activity such as a concert, paint-n-sip or food truck soirée, students will not only persist but will graduate, having climbed the rungs of Maslow’s hierarchy of needs.

Of course, there are instances in which this

strategy works and students at risk of withdrawing from college eventually graduate because of multifaceted (and creative) intervention. However, if campus food-insecurity rates are as high across the country as nascent research indicates (Mason, 2023), and overall student mental and emotional health challenges continue to be widespread and alarming (Marijolic, 2023), these approaches to student satisfaction and retention will be far from adequate. Rarely will a faculty advisor or campus counselor be able to effectively walk a student back from feeling that their basic physiological, security, and esteem needs are unmet when, in fact, these needs are not being met.

The empirical link between food security and persistence in college is well established (Wolfson et al., 2021). We firmly support ongoing investigations aimed at identifying additional causal relationships, while insisting that current circumstances suggest that resources devoted to college retention efforts should at least in part be directed to making sure that every student has access to food. Should *all* matriculated students have access to on-campus food options at no charge, for example? Would lost revenue from dining operations be made up in higher retention rates and higher student achievement? Furthermore, there has been a proliferation of research addressing potential benefits of “free college,” most notably focused on the state-level “promise programs” now found across the country (Nguyen, 2020; Perna & Leigh, 2018). Scholars generally conclude that rates of student enrollment rise when there is access to financial support programs (Swanson et al., 2016). Regardless of whether these programs proliferate, we do know that there is a serious but not insolvable mismatch between eligibility for public support programs and requirements for student financial aid (Duke-Benfield & Sponsler, 2019). Assuring better access to SNAP, Temporary Assistance to Needy Families (TANF), and childcare programs for students would certainly alleviate some of the burden of the high cost of college. The degree to which higher education can integrate discounted tuition initiatives and better use of public-sector assistance programs with a campus ethic that demands that everyone have access to food, regardless of their ability to pay, remains stubbornly uncertain, but

promising. These are important research questions, and there is an increasing need to clarify how particular interventions—from campus foodservice spending policies to the package of services and amenities offered on campus—affect rates of campus food insecurity and whether their effectiveness demands mirroring in the wider food system as changed public spending policies, particularly in food-security support programs (Burrows et al., 2017; Davis et al., 2021; Martinez et al., 2019; Sogari et al., 2018). Moreover, making sure everyone has enough to eat is, without debate, the right thing to do.

To go a step further, there is plenty of evidence that access not just to food but *healthy* food engenders higher student performance (Reuter & Forster, 2021; Weigel Health Center, 2018; Wilder Research, 2014). At one author’s (Evans) institution, Johnson & Wales University, long noted for its culinary arts and food service programs, world-class chefs and their students are working directly with dining services to redesign dining hall offerings to meet strict nutritional standards while preserving flavor and flare. Foodservice management companies and independently operated campus auxiliary services might consider new investment in culinary nutrition or chef professionals, and perhaps internship opportunities with area culinary arts programs, to achieve the same outcomes. Princeton University’s (2019) “Vision for the Future of Dining” represents another example of an institution merging nutrition security and food access with high quality. Again, research should engage around these initiatives to test, for example, whether greater access to nutrition on campuses leads to healthier students and to higher graduation rates. Research inquiries should also aim to test whether the relative costs and benefits of these approaches align with modern campus budget realities.

If changes in campus spending and investment practices around food on college campuses generate healthier students, more graduates, and more effective retention programming budgets, policymakers in the larger food system should take note. Could fundamental changes to the way in which food is subsidized for food-insecure households more than pay for themselves with savings in men-

tal health and healthcare services, and gains in economic output? Though our modern political system rarely exhibits an appetite for programs with immediate costs but delayed benefits, irrefutable evidence from college campuses that approximate the larger economy and food system might be an important catalyst to holistic political change.

Reimagining Foundational Educational Programming

In tandem with (and sometimes as a key component of) retention programming, colleges are increasingly offering “first year seminar” and similar compulsory courses aimed at transitioning freshmen to the campus community. Some of these programs at least peripherally connect the importance of nutrition and physical activity to classroom performance, such as the Nutrition and Healthy Living certificate program at Cornell University (2023), the integration of “teaching kitchen” programming in various residential colleges (Eisenberg et al., 2019), and the First Year Seminar in Nutritional Sciences at Penn State University (2023). Still, food and nutrition have long played second fiddle to discussion of the dangers of alcohol and drug consumption. Furthermore, while students on most campuses are able to take “human nutrition” or food-related classes as liberal arts electives, required courses that address the lifelong connection between food and health, and provide students with resources for developing healthier habits, including tailored nutritionist, dietician, and trainer intervention, are rare (Cousineau et al., 2006; Tallant, 2017).

In the face of breakdowns in modern healthcare and mental health systems, evidenced by the increasing rates of youth depression, anxiety, and suicide (Twenge et al., 2019), and considering the apparent failure of college campuses to deliver ample nutrition to students, is it time to consider nutrition and health programming as *essential* to an undergraduate experience, just as we now consider “freshman transition” inclusive of content areas such as composition, math, and biology? To be effective, this programming likely cannot be delivered in a traditional, passive fashion; instead, one-on-one student nutrition consultations and campus dining offerings must support the core concepts.

We do not propose that this will be a cheap endeavor. But, as with fundamentally different approaches to feeding students on campus, these programs would facilitate powerful research opportunities. We could track not only the implications of explicit, applied nutrition programming for student learning and graduation outcomes but also longitudinal postgraduation life habits, with meaningful extensions to, and implications for, the broader food system.

In particular, campus-level educational programming that is effective in altering food choices and improving nutritional outcomes could inform local, state, and federal policy for the kindergarten-through-twelfth-grade (K-12) sector, where eating habits become entrenched. Nearly 20 years of USDA-funded farm to school educational programming in the K-12 sector shows that incorporating agricultural literacy and food production experiences into health and nutrition programming can enhance positive outcomes related to food choices (Joshi et al., 2008; Prescott et al., 2020). As such, research on creative food educational approaches on college campuses should extend to the impact of campus gardens, agricultural applications in STEM programs, and formal food systems curricula on student nutrition, engagement and performance outcomes. Indirectly, using agriculture as a vehicle for teaching core science, technology, and engineering concepts may engender positive outcomes in the swiftly changing demographic and technological landscape of American farming, illuminating agriculture as a viable career track for students of any major or discipline.

Student engagement remains a key component of this work; all programmatic interventions are mediated by the degree to which higher education can reach students. Porter (2018) and Ventura and Bailey (2017) have eloquently noted the importance of understanding the role of co-investigators: while our research participants are often eager to work alongside us *to study* the problem, they do not want *to be studied*. In our experience as educators and as research directors leading undergraduate and graduate teams, we find that this is likely true of students as well. Therefore, while we propose using the university as a unique laboratory to explore food systems opportunities, we also hypothesize

that the effectiveness of solutions is determined by the degree to which they are co-produced; the stronger the degree of collaborative student/faculty research, the greater the likelihood of finding solutions that will disperse beyond the academy (Amparo et al., 2022). And, for these complex inquiries, it will be especially important to engage the voices of food-insecure and otherwise marginalized students in the design of research and solutions.

More Explicit, Better Funded Approaches to Mitigating Food Waste

That somewhere between 30% and 40% of food produced in the U.S. is wasted is well-documented (Birney et al., 2017; Buzby et al., 2014; Cuéllar & Webber, 2010) and largely indefensible, considering the federal, state, and nonprofit resources devoted yearly to feeding food-insecure households. Though many private and nonprofit organizations have made commitments to reducing waste at the field, distribution, and retail stages of the marketing channel, and the EPA and USDA have established nationwide waste mitigation goals, food waste remains an enduring problem (Horton et al., 2019; Isenhour et al., 2022; Van Bommel & Parizeau, 2020). Colleges and universities also have a history of engagement with this issue. For example, Rhode Island University spearheads a program that recovers food from campus dining halls and distributes it to community food pantries (Siliezar, 2018). The national Campus Kitchens Project continues to successfully divert surplus food from campus facilities to community-based organizations (Himmelheber, 2016). Notably, efforts to address campus food waste also tend simultaneously to offer student opportunities for engagement, thereby creating the type of co-produced outcomes discussed above (Picardy et al., 2021).

Still, designing and sustaining these programs is complicated. As any farmer would attest, prevention of waste at the point of production is costly, as it requires secondary harvests, new markets or buyers, and/or economical access to processing infrastructure (Baker et al., 2019; Johnson et al., 2018). Foodservice managers would attest to the same, as food safety protocols, labor, and storage required for repurposing unused meals and ingredients is cost-prohibitive for most organizations (Munir,

2022). Furthermore, most campus-centered research has focused on efforts to divert waste from campus dining facilities into the broader community (Alattar & Morse, 2021; Rajan et al., 2018; Wilkie et al., 2015). Room remains to divert good food to students experiencing food insecurity and to conduct further research on those efforts. At Johnson & Wales University, a recently launched student organization, Wildcat Food Rescue, has taken charge of food waste mitigation and recovery efforts in the culinary arts laboratories and select campus dining halls. Surplus food is collected, labeled and stored by students daily, repacked into ready-to-heat meals, and distributed weekly at no charge to students. Although the initiative does not specifically target food-insecure students, these students likely make up at least a portion of the audience at pick-up each week. This effort requires substantial student support and faculty oversight, as well as refrigerated storage and packaging. As such, it exemplifies the challenges that any foodservice organization would face in fully tackling the food waste issue, particularly in a way that mitigates food insecurity. Continual assessment of the Wildcat Food Rescue program will be required to measure the extent to which—and the cost of which—food waste reduction alleviates on-campus food insecurity incidence.

Any measurable change in the U.S. food waste crisis will require the support of private and public organizations in the foodservice trenches. Through funding efforts aimed at improving processing, storage and distribution infrastructure, federal and state governments could directly assist food system actors in food recovery efforts that redirect would-be waste to processors and ultimately food-insecure consumers, not only colleges and universities but also K-12 school districts stymied by limited food budgets. As we suggest throughout this essay, college campuses should be used as proving grounds for the effectiveness of foodservice management strategies, food safety protocol, capital investments, novel food and beverage products, and educational programming that mitigates waste in the hopes that extensions to the larger food system are possible.

Even before the impact of the pandemic, food, in a myriad of problematized ways, was moving up

policy agendas. Food insecurity, the vulnerability of aging American food systems infrastructure, and the entrenched complexity of the food-climate nexus necessitate a revisioning of all aspects of food production, distribution, consumption, and waste management. The college campus faces internal complexities of its own, not the least of which are balancing rising costs and shifting cultural reinterpretations of education's value with an increasingly diverse and financially pressed student population. While we are hesitant to imply that any of these stressful situations be portrayed as opportunities, we should be strategic and open-minded in viewing the college campus as an analog to the larger food system. As the example of Johnson & Wales University shows, campuses have much to offer as test sites for policy, investment, and management interventions that facilitate net improvements to food-related outcomes and ultimately, quality of life.

This work of drawing upon successful campus-level policy and investment strategies to formulate novel approaches to complex food system challenges should begin with case study analyses of progressive spending, educational programming, and food waste mitigation interventions happening now at colleges and universities around the country. Although it will take time to understand empirically the impacts of these interventions on physical and mental health, persistence, food literacy, food insecurity, equity, and sustainability (economic, ecological, and otherwise), we propose and invite a research agenda that collaboratively engages a diverse set of campuses as living laboratories for innovative solutions to food system crises.

For the sake of our students, and with the hope that we may uncover insights into radical transformation within our wider food system, we consider this a vital, and unmissable, opportunity.

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